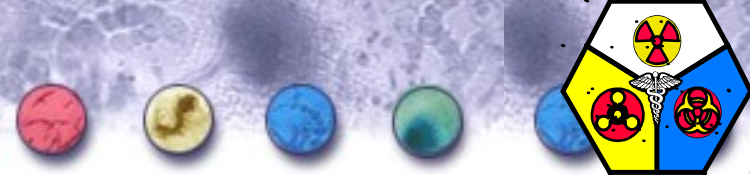


Medical NBC Briefing Series
Medical NBC Aspects of
St. Louis Encephalitis





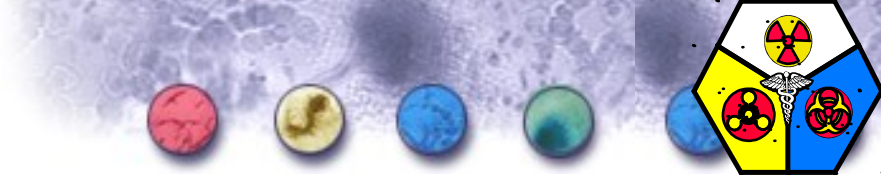
Purpose

- *This presentation is part of a series developed by the Medical NBC Staff at the U.S. Army Office of The Surgeon General.*
- *The information presented addresses medical issues, both operational and clinical, of various NBC agents.*
- *These presentations were developed for the medical NBC officer to use in briefing either medical or maneuver commanders.*
- *Information in the presentations includes physical data of the agent, signs and symptoms, means of dispersion, treatment for the agent, medical resources required, issues about investigational new drugs or vaccines, and epidemiologic data.*
- *Notes page.*



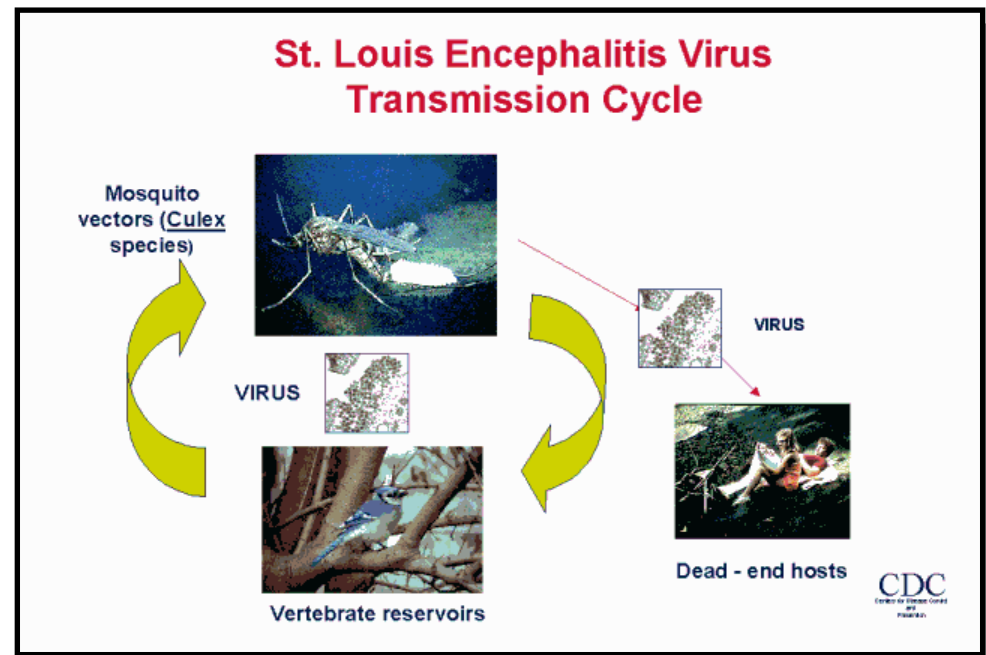
Office of the Surgeon General
for the Army

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Outline

- **Background**
- **Battlefield Response**
- **Medical Response**
- **Command and Control**
- **Summary**
- **References**

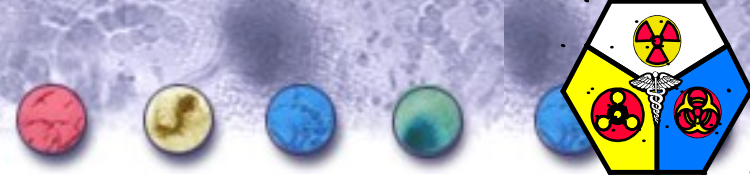




Background



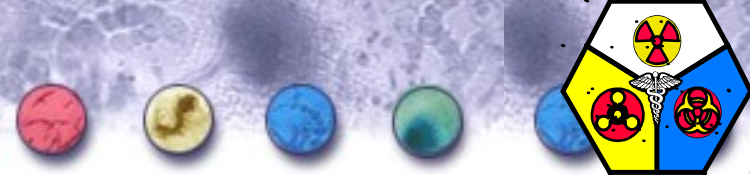
- **Disease Background**
- **Disease Course Summary**
- **Signs and Symptoms**
- **Diagnosis**
- **Treatment**
- **Current Situation**
- **Weaponization**



Disease Background

- **St. Louis encephalitis (SLE) is a mosquito-borne virus**
- **Most people who are infected with the virus never show any outward symptoms**
- **Those who do exhibit symptoms face a life-threatening situation**
- **No vaccine**
- **Treatment is supportive**
- **First discovered in 1933 in St. Louis, Missouri**

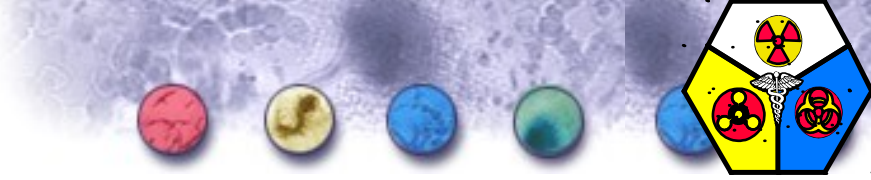




Disease Course Summary for Severe Cases of SLE

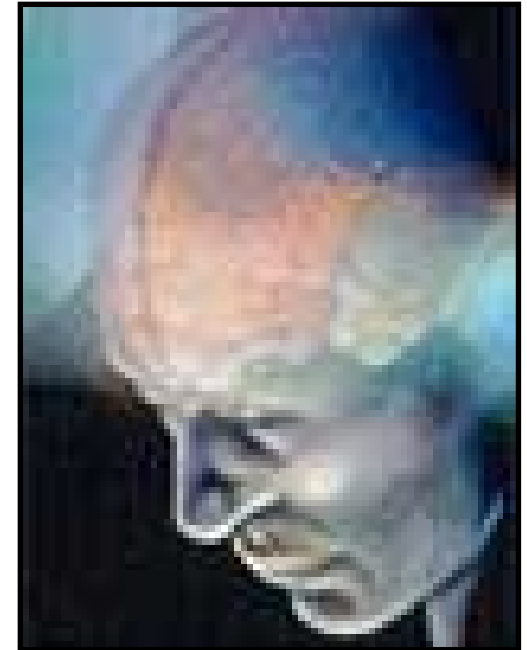
in Untreated Individuals

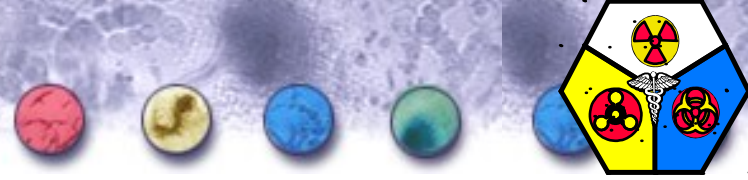
Day 1 EXPOSUR E	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Incubation from 5 to 20 days						
Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
Incubation from 5 to 20 days						
Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21
Symptoms are generally flu-like, with fever, headaches, and lethargy						
Severe cases of SLE can cause seizures, double-vision, paralysis and death						
Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28



Signs and Symptoms

- **Most infected people never show any symptoms**
- **Mild cases may occur with flu-like symptoms, a slight fever, and headache**
- **Severe infections are marked by a rapid onset of symptoms such headaches, high fever, disorientation, coma, tremors, convulsions, paralysis, or death**

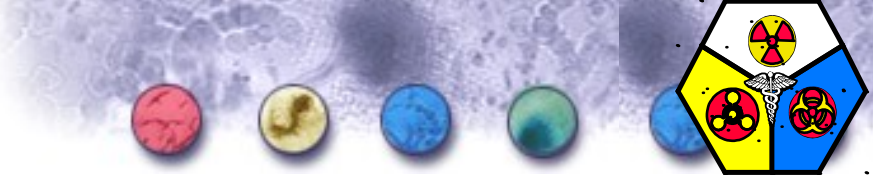




Diagnosis

- **Difficult to diagnosis clinically**
 - SLE is one of many causes of encephalitis
 - Symptoms are nonspecific
 - Presumptively diagnose illness as one of the forms of encephalitis
- **Diagnosis of SLE requires a blood test and/or spinal tap**
- **Antibody to any of the *Flavivirus* group will react quite strongly with the SLE viral antigen**





Treatment

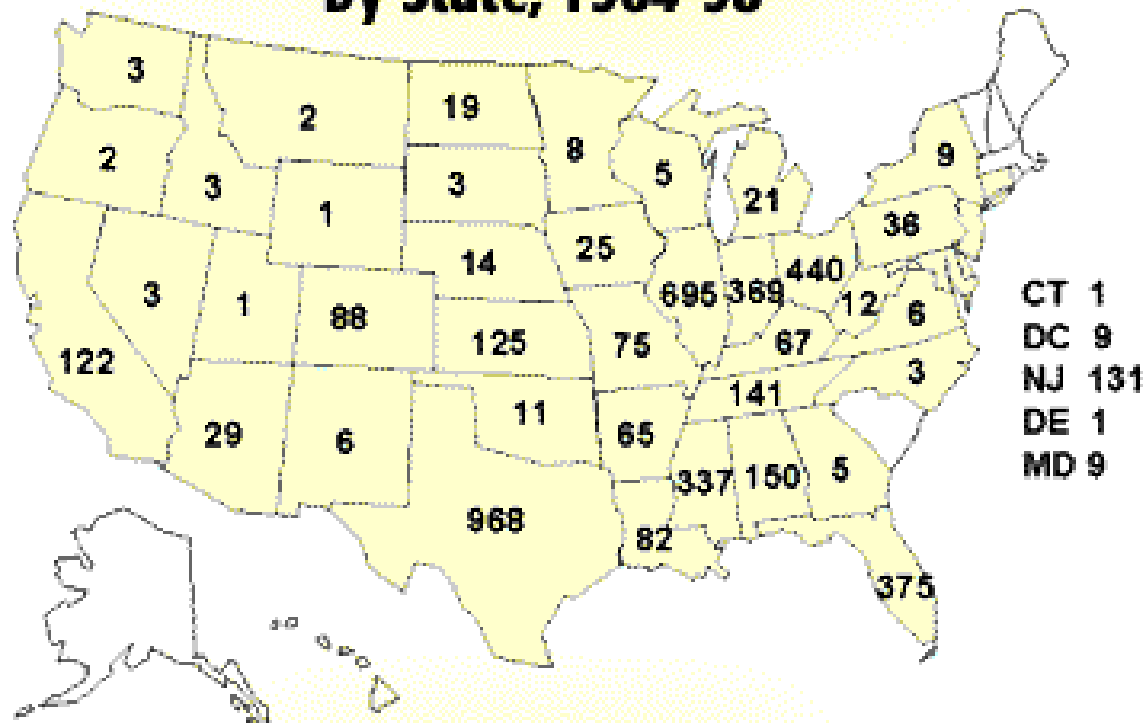
- **No cure for SLE**
- **Primarily supportive care**
 - Drink plenty of fluids
 - Medicine to relieve fever and discomfort
 - Hospitalization of patients with advanced symptoms
 - Prevention of secondary complications such as bacterial infections
- **Antibiotics are NOT effective**





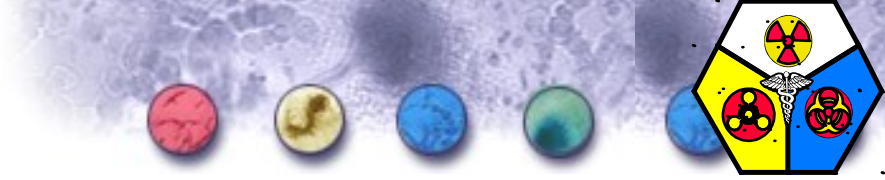
Current Situation

Human St. Louis Encephalitis Cases by State, 1964-98



4,478 confirmed cases

CDC
Centers for Disease Control and Prevention



Weaponization

- **Threat risk**

- Several countries have examined SLE as a possible biological weapon
- Most people infected with SLE are asymptomatic or develop only mild symptoms
- Therefore, SLE is an unlikely choice for a biological attack on the battlefield

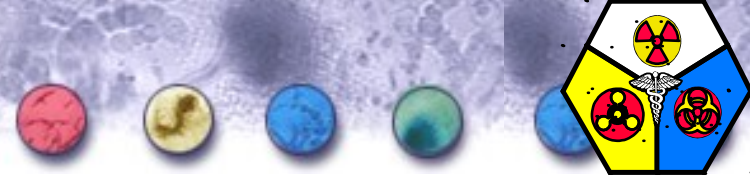
- **Aerosolization**

- Highly infectious via aerosol
- Delivery systems can be simple, such as spray systems or stationary munitions

- **Arthropod vectors**

- Cause widespread outbreaks
- Longer-term epidemic than aerosol

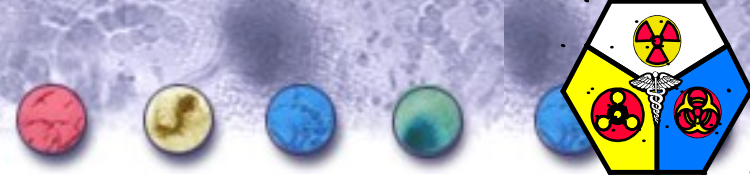




Battlefield Response to St. Louis Encephalitis

- **Detection**
 - Environmental detection
 - Clinical detection
 - Medical surveillance
- **Protection**
 - Vaccination
 - Individual protection
 - Collective protection





Detection

- **Possible methods of detection**
 - Detection of agent in the environment
 - Clinical (differential diagnosis)
 - Medical surveillance (coordination enhances detection capability)
- **Diagnosis of St. Louis encephalitis is not presumptive of a BW attack**

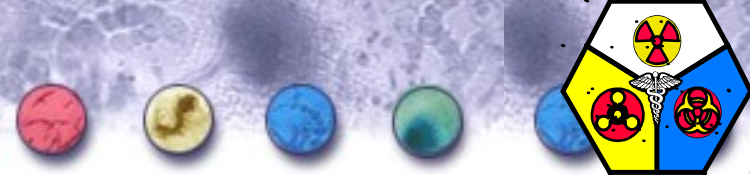




Detection of Agent in the Environment

- Biological Smart Tickets
- Enzyme Linked Immunosorbant Assay (ELISA) (Fielded with the 520th TAML)
- Polymerase Chain Reaction (PCR) (Fielded with the 520th TAML)

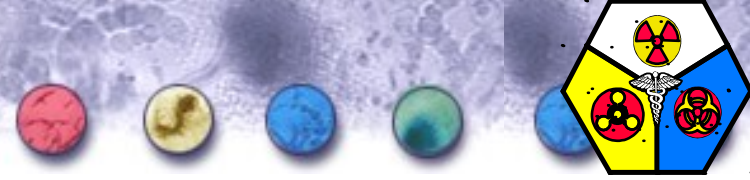




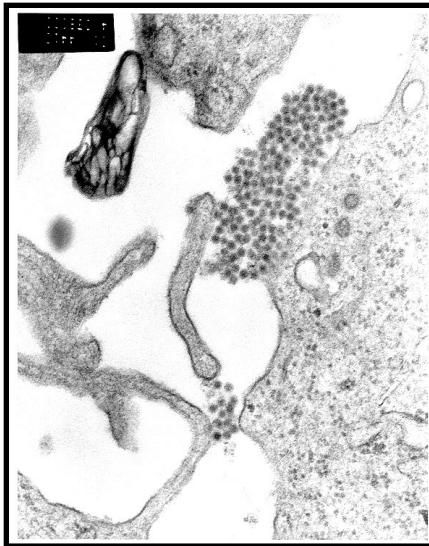
Detection of Agent in the Environment (cont.)

- **M31E1 Biological Integrated Detection System (BIDS)**
- **Interim Biological Agent Detector (IBAD)**





Clinical Detection



- **Clinical presentation**
 - Difficult to diagnosis clinically
 - SLE is one of many causes of encephalitis
 - Symptoms are nonspecific
 - Presumptively diagnose illness as one of the forms of encephalitis
- **Laboratory confirmation**
 - Division medical assets may lack lab equipment to conduct test to determine SLE
 - Specimen must be sent to theater level or CONUS lab
 - Contact lab prior to collection or preparation in order to assure proper methods are utilized



Detection by Medical Surveillance



MARYLAND ARMY NATIONAL GUARD
DISCOM 29th Infantry Division (Light)
DIVISION MEDICAL OPERATION CENTER (DMOC)



Patient Summary Report 29th INF (L) DIV

From: Division Medical Operations Center (DMOC)
To: Division Surgeon

Date Time Group: From: 121200RJUN99
To: 202400RJUN99

PATIENTS

Nation	WIA	NBI	Disease	Neuropsychiatric Stress-Related	Total
US	0	97	55	0	152
Allied	0	0	0	0	0
EPW	0	0	0	0	0

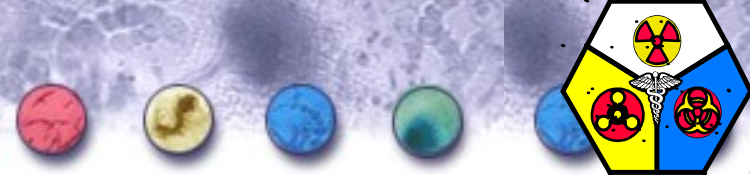
DISPOSITION

Return to duty	148
Holding in Division's MTFs	0
Evacuated and returned	3
Evacuated by air	0
Evacuated by ground	1
Expired en route	0
Expired in MTF	0

Clues in the daily medical disposition reports

- Large numbers of individuals in the same geographic area presenting with flu-like symptoms, a slight fever, and headache
- Smaller number of severe cases of illness

17 • Difficult to distinguish 23

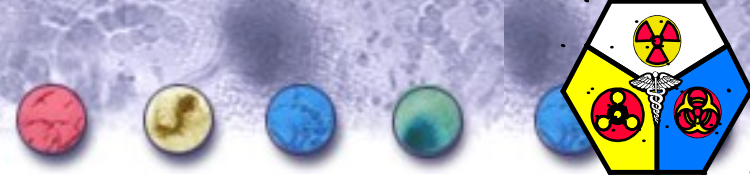


Protection by Vaccination

**There is no vaccine available for the
SLE virus**



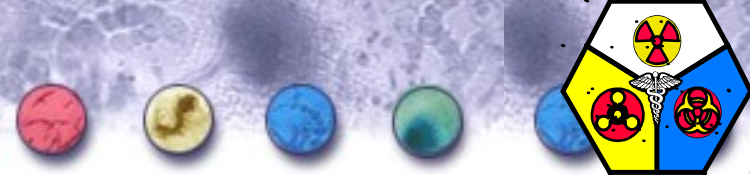
NOT AVAILABLE FOR SLE



Individual Protection

- **Mask and BDO with gloves and boots**
- **Standard uniform clothing affords reasonable protection against dermal exposure to biological agents**
- **Casualties in contaminated areas**
 - A casualty suffering from SLE does not necessarily need to wear MOPP or be in a casualty wrap since they are already infected
 - Having a casualty suffering from conventional wounds who is MOPP or





Collective Protection

- **Hardened or unhardened shelter equipped with an air filtration unit providing overpressure**
- **Standard universal precautions should be employed as individuals are brought inside the collective protection units**
- **SLE is not communicable from**

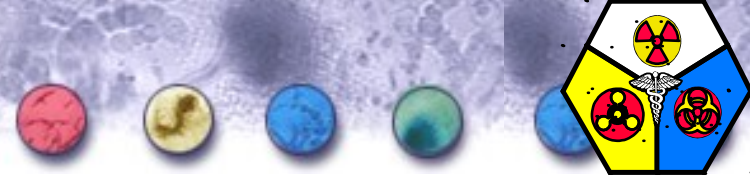




Medical Response to St. Louis Encephalitis

- Triage and Evacuation
- Evacuation or Quarantine
- Infection Control
- Resource Requirements





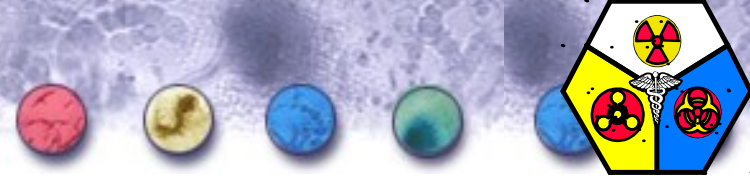
Triage and Evacuation

- **Triage**

- Priorities based on severity of symptoms
- Need to differentiate from other BW agents that present with flu-like symptoms such as anthrax

- **Evacuation**

- Need for evacuation will depend on severity of symptoms and METT-T
- Standard infection control precautions during transport
- May consider treatment in place or even outpatient treatment for a mass casualty



Evacuation or Quarantine



Figure 8-6. Arms carry.

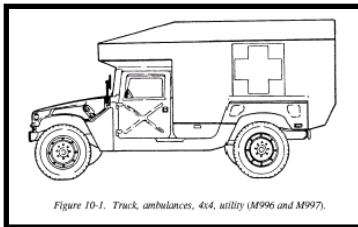
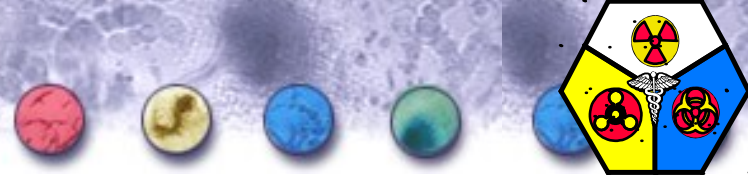


Figure 10-1. Truck, ambulances, div4, utility (M996 and M997).

- **Evacuation**
 - Most patients show only mild symptoms and can RTD in the normal theater evacuation policy of 15 days
- **Quarantine**
 - Not communicable person to person but can be spread through mosquitoes
 - Quarantine may limit spread
 - Unlike smallpox, SLE is already endemic
- **Guidance**
 - Seek guidance from CINC and MTF Commanders before evacuating large numbers of patients

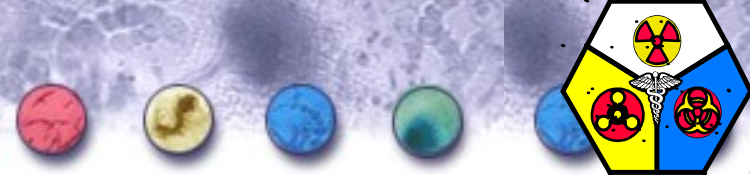


Infection Control



- **No reported cases of direct person to person transmission**
- **Transmitted through vectors (mosquitoes)**
- **Protect against vectors**
- **Use standard universal precautions during treatment**





Resource Requirements

- **Medication**
- **Treatment facilities**
- **Supportive therapies**
- **Intensive care facilities for severely ill patients**
- **Possibility for in-theater treatment of large numbers of patients**
- **Repellents and other control means to prevent the spread by vectors**

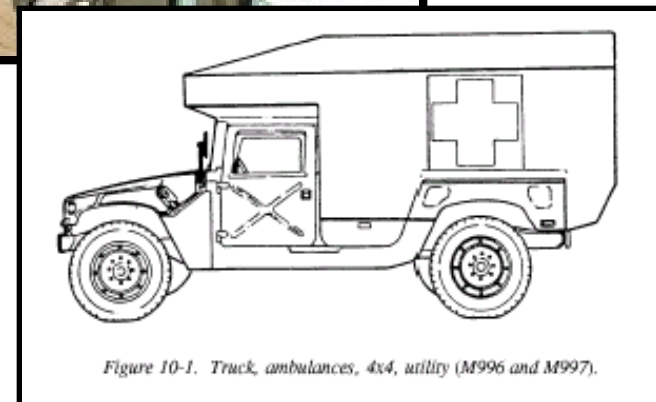
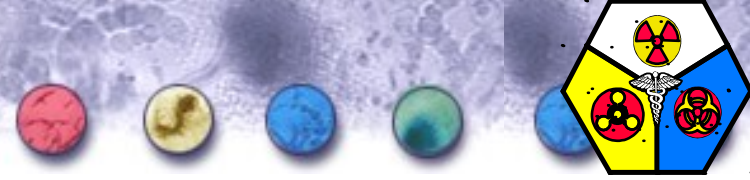


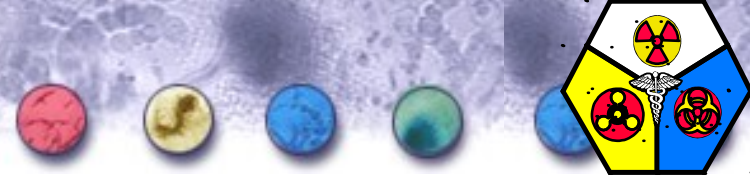
Figure 10-1. Truck, ambulances, 4x4, utility (M996 and M997).



Command and Control



- **Considerations**
- **Response to Psychological Impact**



Considerations

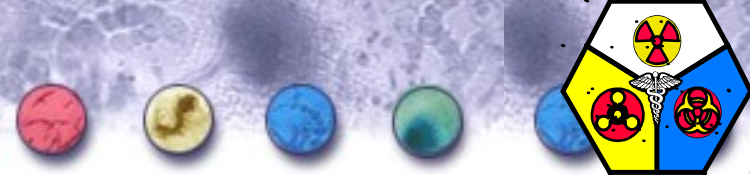
- **Intelligence**
 - Medical surveillance and intelligence reports are key to keep the Command alert to the situation
- **Outpatient treatment, In-theater treatment, or Evacuation**
- **Maneuver**
 - Quarantine, if imposed, may limit maneuverability of units
- **Infection Control**
 - Command responsibility to ensure proper infection control, field sanitation, and personal hygiene measures
- **Manpower**
 - While a large percentage of the fighting force may become infected, most will be asymptomatic or develop only mild symptoms
- **Logistics**
 - Additional Class VIII materials will be required and evacuation routes to Echelon III will be heavily utilized



Response to Psychological Impact

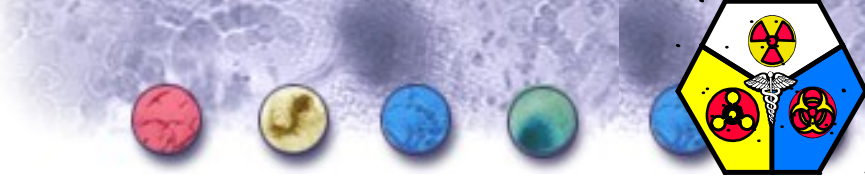
- **May vary from person to person**
- **Psychological Operations**
 - Rumors, panic, misinformation
 - Soldiers may isolate themselves in fear of disease spread
- **Countermeasures**
 - LEADERSHIP is responsible for countering psychological impacts through education and training of the soldiers
 - Implementation of defensive measures such as crisis stress management teams





Summary

- **SLE is endemic to the U.S. and other parts of the world**
- **SLE is transmitted by vectors**
- **The possibility for weaponization exists, but SLE is an unlikely choice**
- **Detection may not occur until after exposure when patients are reported**
- **Command decisions that will be required upon detection of SLE include the following:**
 - Far-forward treatment, treatment at MFT, or evacuation to CONUS?
 - Additional resources for far-forward treatment



References

- Bayonet.Net website: www.bayonet.net.
- Biological and Chemical Warfare Online Repository and Technical Holding System (BACWORTH), Version 3.0. Battelle Memorial Institute, 1997.
- Department of Defense, *Annual Report to Congress for Chemical and Biological Defense Program*, March 2000.
- Department of the Air Force, Medical Service Corps. Slide presentation: *The 100 Greatest Military Photographs*.
- Department of the Army. FM 8-10-6: *Medical Evacuation in a Theater of Operations*, April 2000.
- Department of the Army. FM 8-9: *NATO Handbook on the Medical Aspects of NBC Defensive Operations*, February 1996.
- Department of the Army. FM 21-10: *Field Hygiene and Sanitation*, November 1988.
- HealthAtoZ.Com website: www.healthatoz.com/atoz/default.asp.
- National Research Council and Institute of Medicine, *Chemical and Biological Terrorism, Research and Development to Improve Civilian Medical Response*, Washington DC: National Academy Press, 1999.
- Premier-Net.Com website: www.vicioso.com/Health/disease/encephalitis/SLE.html.
- Website for the American Headache Society: www.ahsnet.org.
- Website for the ARUP Laboratories: www.aruplab.com/about/overview.htm.
- Website for the Center for Disease Control and Prevention: www.cdc.gov/ncidod/dvbid/arbor/SLE_QA.htm.
- Website for the Florida Medical Entomology Laboratory: www.ifas.ufl.edu/~veroweb/online/sle.htm.
- Website for the Mount Sinai Hospital, Department of Microbiology, Toronto, Canada: microbiology.mtsinai.on.ca/Bug/flu/flu-bug.htm.
- Website for the Nikon Microscopy: www.microscopyu.com/galleries/dxm1200/culexlarge.html.
- Website for the Pasco County Mosquito Control District: www.pasco-mosquito.org.
- Website for the U.S. Army Center of Military History: www.army.mil/cmh-pg.
- Website for the U.S. Army Medical Department Regiment, U.S. Army: ameddregiment.amedd.army.mil/distinct.htm.



Battelle Memorial Institute created this presentation for the U.S. Army Office of The Surgeon General under the Chemical and Biological Defense Information Analysis Center Task 009, Delivery Number 0018.

